CLAIMS

1. An optical information storage medium comprising

a substrate, and

a multilayer structure, which is provided on the substrate and includes at least one storage layer,

wherein the at least one storage layer includes polydiacetylene or merocyanine and is amorphous.

2. The optical information storage medium of claim 1, wherein the multilayer structure further includes a thermoplastic resin layer that is arranged so as to contact with at least one surface of the at least one storage layer.

3. An optical information storage medium comprising

a substrate, and

a multilayer structure, which is provided on the substrate and includes at least one storage layer,

wherein the multilayer structure further includes a thermoplastic resin layer that is arranged so as to contact with at least one surface of the at least one storage layer.

4. The optical information storage medium of claim 3, wherein the at least one storage layer includes at least one compound selected from the group consisting of tellurium oxide, zinc oxide and zinc sulfide and is amorphous.

5. The optical information storage medium of claim 3, further comprising a heat insulating layer for reducing conduction of heat that has been generated in the at least one storage layer,

wherein the thermoplastic resin layer is arranged so as to contact with one surface of the at least one storage layer, and the heat insulating layer is arranged so as to contact with the other surface of the at least one storage layer.

6. The optical information storage medium of claim 5, wherein the heat insulating layer includes either a thermosetting resin or an inorganic oxide or inorganic sulfide that is different from the material of the at least one storage layer.

7. The optical information storage medium of claim 1, wherein the at least one storage layer is substantially transparent to a write beam with a first wavelength and a read beam with a second wavelength, and produces multiphoton absorption against the write beam.

8. The optical information storage medium of claim 7, wherein the material of the at least one storage layer has a third-order nonlinear constant of at least 0.5×10^{-12} esu.

9. The optical information storage medium of claim 7, wherein the second wavelength is approximately half as long as the first wavelength.

10. The optical information storage medium of claim 7, wherein the thickness of the at least one storage layer is defined so as not to reflect the write beam but to reflect the read beam.

11. The optical information storage medium of claim 1, comprising a plurality of storage layers, including the at

least one storage layer, wherein the storage layers are arranged so as to be spaced apart from each other by a separating layer.

12. The optical information storage medium of claim 1, wherein information is stored in multiple layers within the at least one storage layer.

13. A method for reading and/or writing information from/on the optical information storage medium of claim 1, the method comprising the step(s) of

writing the information including the step of producing multiphoton absorption locally in the at least one storage layer of the optical information storage medium by focusing a write beam having a first wavelength on the at least one storage layer, and/or

reading the information by focusing a read beam having a second wavelength on the at least one storage layer of the optical information storage medium and detecting light reflected therefrom.

14. An apparatus for reading and/or writing information from/on the optical information storage medium of claim 1, the apparatus performing the step(s) of

writing the information including the step of producing multiphoton absorption locally in the at least one storage layer of the optical information storage medium by focusing a write beam having a first wavelength on the at least one storage layer, and/or

reading the information by focusing a read beam having a second wavelength on the at least one storage layer of the optical information storage medium and detecting light reflected therefrom.

15. The apparatus of claim 14, wherein the second wavelength is approximately half as long as the first wavelength.

16. The apparatus of claim 14, wherein the write beam has one emission duration of 15 picoseconds to 15 nanoseconds.

17. The optical information storage medium of claim 3, wherein the at least one storage layer is substantially transparent to a write beam with a first wavelength and a read beam with a second wavelength, and produces multiphoton absorption against the write beam.

18. The optical information storage medium of claim 3, comprising a plurality of storage layers, including the at least one storage layer, wherein the storage layers are arranged so as to be spaced apart from each other by a separating layer.

19. The optical information storage medium of claim 3, wherein information is stored in multiple layers within the at least one storage layer.

20. A method for reading and/or writing information from/on the optical information storage medium of claim 3, the method comprising the step(s) of

writing the information including the step of producing multiphoton absorption locally in the at least one storage layer of the optical information storage medium by focusing a

write beam having a first wavelength on the at least one storage layer, and/or

reading the information by focusing a read beam having a second wavelength on the at least one storage layer of the optical information storage medium and detecting light reflected therefrom.

21. An apparatus for reading and/or writing information from/on the optical information storage medium of claim 3, the apparatus performing the step(s) of

writing the information including the step of producing multiphoton absorption locally in the at least one storage layer of the optical information storage medium by focusing a write beam having a first wavelength on the at least one storage layer, and/or

reading the information by focusing a read beam having a second wavelength on the at least one storage layer of the optical information storage medium and detecting light reflected therefrom.